

Section 5

Natural and Cultural Resources

Goal: *To protect, enhance and preserve the integrity of wetlands, watersheds, existing and potential aquifers, groundwater recharge areas, ponds, streams, and floodplains.*

Policies: *Protect and preserve the important historic and cultural features that are critical components of Hanover's heritage.*

Ensure that future development and redevelopment respects the traditions and character of the historic village centers, residential areas, and the visual character of Hanover.

INTRODUCTION

As the amount of undeveloped land dwindles in eastern Massachusetts, communities are beginning to realize that land lost to development cannot be retrieved. This realization has created a sense of urgency and well as a fierce protectiveness of existing open space resources. Many suburban residents have learned the value of open space the hard way — by losing it. Most often it is the “sudden” development of a piece of land that one drives by every day that hits hardest, and makes us aware of the value and fragility of open space.

With the continuous loss of undeveloped land, communities have begun to recognize the many functions that open space serves. From an environmental perspective, open lands provide wildlife habitat, protect aquifer recharge, control flooding and prevent erosion and siltation. Open spaces also provide for the human needs of active and passive recreation and the more recent acknowledgment of aesthetics - including scenic views not only from a place but to a place off in the distance. Scenic views from roadways may serve less value as habitats for wildlife or recreation, but may be appreciated more by residents merely because they are recognized and enjoyed frequently by a greater population of the community.

Although somewhat intangible, natural and cultural resources also contribute strongly towards community character. These resources are the very fabric that make a community unique, and are treasured by most residents (sometimes unknowingly). It is difficult to assign a value to open space and natural and cultural resources, as its worth is often intangible and, therefore, not easily quantifiable. However, we are all aware that these open space resources are valuable due to unique features, or in many cases, just because undeveloped land is becoming so scarce.

Along with enhancing the quality of life, protecting open space can provide profound economic benefits. It can help a community avoid the costly mistakes of misusing or overwhelming available resources. A contaminated water supply, for example, must be replaced through expensive solutions such as piping water from other sources. In contrast, protected open space usually raises the taxable value of adjacent properties and is less costly to maintain than the infrastructure and services required by residential development. Even taking into account the increased tax base that results from development, open space usually proves easier on the municipal budget in the long run.

Protecting [Hanover's] open spaces is not necessarily synonymous with costly acquisitions. Many municipalities and private nonprofit groups hold conservation restrictions on public and private property. These restrictions are interested in land acquired through gift, purchase, or regulatory exaction, and are designed to preserve natural resources from adverse future use.¹

The Town of Hanover, located in the greater Boston area, offers residents the benefits of living in a small suburban town while being within convenient distance to the city. However, the semi-rural suburban character that proves attractive to so many, could result in uncontrolled growth in the community. A recent survey of Hanover residents revealed that the three most serious issues facing Hanover today are schools (overcrowding, quality and budget); commercial and residential development; and traffic. All three issues are the end-product of growth. Additionally, survey respondents indicated that Hanover's small-town atmosphere, schools, and recreational facilities and/or community sports are the primary characteristics or services that should be developed and maintained.

NATURAL RESOURCES

Topography

Hanover is part of the coastal lowland section of the New England physiographic province and has gently rolling to flat topography characteristic of this region.² Hanover is shown on four USGS Topographic Maps: Whitman, Weymouth, Cohasset and Hanover. The elevation throughout the town ranges from 10± feet above sea level at the headwaters of the North River to 177± feet at the top of Walnut hill in the Northeast corner of Hanover. Other significant topographical features include several low hills found in the northeast and northwest sections of town, and low areas containing swamps, three of which are named (see table). Several cranberry bogs in the southeast and southwest sections of Hanover also present, as well as a sand pit in the south and a gravel pit by the Silver Brook.³

¹ The Open Space Planner's Workbook. 1990. Massachusetts Executive Office of Environmental Affairs, Division of Conservation Services and the Department of Environmental Management

² Town of Hanover. 1979. Hanover Open Space Plan, page 26.

³ United States Geological Survey. Quadrangle maps for Weymouth (1971); Whitman (1962); Cohasset (1961); and Hanover (1978).

Table 5-1: Major Hills in Hanover

Hills	Elevation
Walnut Hill	177 \pm feet
Tumbledown Hill	140 \pm feet
King Hill	140 \pm feet
(Water tower hill)	155 \pm feet

Source: USGS Topographic Maps; Whitman, Hanover, Weymouth, Cohasset Quadrangles

Drainage patterns throughout Hanover are determined by an extensive swamps and brook system which feed three major waterways: the Drinkwater River, the Indian Head River, and the Third Herring Brook. Most of the drainage from the western side of town flows into the Drinkwater river, eventually reaching the Indian Head River. Other brooks flow directly into the Indian Head River and The Third Herring Brook, both of which define over half of the town's boundaries. These two waterways come together to form the North River at Hanover's borders with Pembroke and Norwell, and are a significant area resource.⁴

Table 5-2: Drainage Area Tributaries

Drinkwater River Drainage area	Indian Head River Drainage area	Third Herring Brook Drainage area
French Stream	Iron Mine Brook	Silver Brook
Ben Mann Brook		Molley Brook
Cushing Brook		
Longwater Brook		
Torrey Brook		

Source: USGS Topographic Maps; Whitman, Hanover, Weymouth, Cohasset Quadrangles

Although the majority of the Town is generally flat or gently sloping, the several areas of steeper slopes have restricted development potential, due to the expense of site preparation required for development. In general, these areas are found within the southern portion of the town. These areas include a hill located east of Columbia Road, west of River Road and South of East Street on the east-central side of town with 10-15% slopes, a hilly area in the center of the town between Main Street, Silver Street and Larchmont Lane with 10% slopes, a sloping area south of Hanover Street, north of Circuit Street and east of Plain Street that runs roughly parallel with Circuit Street with slopes of 15-20%, an area located east of Hillside Drive at Heritage Way with up to 30% slopes, and an area bounded roughly by Hanover, Washington, Rockland Street and extending south of Rockland Street in the southeast corner of town with slopes ranging from 15-25%.

⁴ Ibid. (same Quads)

Geology

Bedrock. The bedrock geology includes rocks of both igneous and sedimentary origin which have undergone low-grade metamorphic episodes. The two major rock types include a light grayish-pink to greenish-gray granite which was intruded into the existing bedrock and a sedimentary rock comprised of shale, sandstone, conglomerate and greywacke with minor beds of fossil plants. The sediments making up the second rock type were deposited after the intrusion of the granite, when the area formed part of the Narragansett Basin.

The two major rock types in Hanover have each undergone low grade metamorphism. The zone associated with the granite, found in the eastern side of the town, exhibits mineral assemblages associated with a low grade metamorphic zone, formed during the Proterozoic Z metamorphism. These rocks often show greenschist, greenstone, felsite and quartzite assemblages enveloped in granite. While the rocks found mostly on the western side of town, part of the metamorphic zone associated with the sedimentary rocks, exhibit mineral assemblages typical of the Chlorite Zone. The typical chlorite-muscovite assemblages visible within these rocks were formed during a Pennsylvanian-Permian metamorphic episode 270 million years ago.

Hanover is also located on the edge of the Narragansett Basin between two tectonic provinces, with several minor faults trending in a general north-south direction. The Milford-Dedham Zone, which includes the town of Hanover, has had a complex tectonic history involving granite intruded into older volcanic and plutonic rocks millions of years ago, followed by a period of erosion, and the deposition of continental sediments on top of the older granite.⁵

Surficial Geology. The surficial deposits in Hanover which make up most of the soils and all of the deposits above the bedrock include predominantly glacial sediments. As the glaciers retreated northward at the end of the Wisconsin Ice Age, they left thick stratified drift deposits made up of well sorted sands and gravels and unstratified deposits made up of poorly sorted tills. Even more recently organic matter has accumulated in the form of swamp deposits and alluvium has been deposited by present day streams.⁶

Soils

The general soil types which can be found in Hanover include three different associations. A small area of Tidal Marsh-Dune land-Coastal beach association is located in the southeast corner of town and is part of the influence of the North River. A large finger of Hinckley-Merrimack-Muck association covers the central portion of Hanover. The third general soil type can be found in both the northwestern and eastern areas of town and is known as the Scituate-Essex-Merrimac association.

The geographic location of soil types within Town as mapped by the Soil Conservation Service are illustrated in Figure 5-1.

⁵ Massachusetts Bedrock Geology Map

⁶ United States Geological Survey. Hanover & Whitman Quads (Weymouth & Cohasset unpublished)

Figure 5-1: Soils

Table 5-3: General Soil Associations and Distribution

General Soil Associations	Approximate Acreage	Percent
Scituate-Essex-Merrimac	5,370	53
Hinckley-Merrimac-Muck	4,500	45
Tidal marsh-Dune Land-Coastal Beach	190	2
<i>TOTAL:</i>	10,060	100

Source: Acreage derived from General Soil Map of Plymouth County (1968).

The most predominant soil association in Hanover is the Scituate-Essex-Merrimac Association, occupying approximately 53% of the town's land area. Hills and ridges are interspersed among broad, low-lying plains and terraces. The slopes for the most part are gentle to moderately steep. The maximum elevation is less than 200 feet. Essex and Scituate soils occupy the uplands. They are deep, gently sloping to moderately steep coarse sanding loams underlain at a depth of 18 to 30 inches by firm but coarse glacial till. The Merrimac soils occupy the nearly level plains and terraces.⁷

The Hinckley-Merrimac-Muck Association, occupying approximately 45% of the town's area, consists of broad, low ridges, nearly level plains and terraces, and knobby, irregular ridges. Intermingled with these are low, flat wet areas. The elevation of this association is generally between 50 and 150 feet. Hinckley soils are deep, excessively drained gravelly loamy sands on gentle to steep slopes. Merrimac soils are well-drained and somewhat excessively drained sandy loams underlain by sand and gravel. Muck is an organic soil that occurs in low-lying areas.⁸

In Hanover the Tidal marsh-Dune land-Coastal beach Association, which occupies approximately 2% of the town's land area, consists of tidal marshes along the North River. Tidal marshes vary greatly in composition. Some areas consist mainly of organic material and others of mineral material, chiefly silt and clay. Tidal marsh is valuable as habitat for various kinds of waterfowl, for some mammals, and for many marine organisms.⁹

Soils can also restrict the potential for development. Some soil types are not suitable for development. For example, because they are very poorly drained and have a high water table, some soils restrict the future development options for these parcels. This restriction often results from an inability to provide sewage disposal due to poor drainage and/or high water table. Other types occur on steep slopes (greater than 15%) or where bedrock is close to or at the surface. Based on "Soils and their Interpretations for Various Uses" prepared for the Town of Hanover under the direction of the USDA Soil Conservation Service, we can describe the general soil areas of the town and summarize the broad soil interpretations for a variety of uses, by grouping soil types into associations.

⁷ Soil Survey Plymouth County Massachusetts. 1969. General Soils Map and description.

⁸ Ibid.

⁹ Soil Survey Plymouth County Massachusetts. 1969. General Soils Map and description.

Almost 3,500 acres of the approximately 10,000 acres in Hanover have severe limitation for development due to poor drainage conditions. Widely distributed wetlands comprise a total of 2,000± acres of muck and peat swamps, poorly and very poorly drained soils. These conditions make development difficult and expensive due to drainage problems. Further, development is severely restricted by state and federal regulations design to protect these natural resources. An additional 15-20% of the town's acreage is made up of soils that may restrict uses due to slopes, and the presence of boulders and rocky conditions. In general, approximately 50-60% of the total acreage in the Town of Hanover has limitations for development that may prohibit development or increase the costs of development substantially. It should be noted, however, it is possible that lots which contain development constraints may also contain soils suitable for development .

The Peat-Muck association of soils is the most restrictive of the general areas used to describe the soils in Hanover, and is located within the wetland areas. According to the USDA SCS Soils Interpretation, this soil association occupies 22± % of the town. These soils developed in organic materials and is underlain by mineral soils. The water table in these soils is at or near the surface for most of the year, and as a result, areas with these soils have severe limitation for residential, commercial, and industrial uses because of drainage problems. In addition, this soil association cannot support foundations or footings.

Areas with Scarboro-Whitman-Ridgebury soil associations are poorly and very poorly drained soils in low lying areas. This association is found in 15±% of the town's total acreage. The dominant soils are the very poorly drained Scarboro and Whitman and the poorly drained Ridgebury soils, all found in low lying areas adjacent to waterbodies and waterways and often adjacent to areas containing Peat-Muck soils, and/or receive runoff and seepage from adjacent sloping areas. The water table is at or near the surface most of the year in the Scarboro and Whitman Soils and approximately 7-9 months out of the year in the Ridgebury soils.

The Scarboro-Whitman-Ridgebury soils association is also restrictive to development planning due to the difficulty in draining the saturated soils. These areas are best suited to conservation and open space uses, as they are suitable for wetland wildlife habitat. Poorly drained soils (i.e. Ridgebury) can be used for pasture.

The Scituate-Essex association of soils is much less widely scattered throughout the town, and comprises about 6% of the total acreage. In general, this association is found in the south-western portion of town in the general area of the intersection of Myrtle and Center Streets; in several areas in the northern portion of the town-- near Walnut Hill, again near the intersections of Main and Webster Streets, and a third area between the Longmeadow and Shinglemill Rivers, north of Route 123.

The Scituate and Essex soils that comprise this association developed on glacial till. Hardpan occurs 18-30 inches below the surface, which is so compact that drainage is restricted. These soils occur on slopes with grades of 3-15%.

This association is the third most limiting of the general groups in Hanover. Due to the hardpan underlying surface soils, there is very slow permeability restricting all uses that use individual effluent disposal systems. The upper soils become saturated during periods of high rainfall, and flows laterally along hardpan, resulting in seepage into cellars, early failure of paved road surfaces.

The remaining soil associations in general will support residential, commercial, and industrial uses, individual septic systems, and roadways, agriculture and forestry. Slopes may occur throughout, creating a greater expense for site preparation, and availability of water varies greatly in terms of capacity.

Water Resources

The streams, brooks and rivers in Hanover support an extensive wetlands system which generally follows the dominant drainage patterns and waterways in the town. Wetlands make up 20% of the land within Hanover, and are important to the prevention of flooding and the protection of water quality (*see Figure 5-2*). However, these resource areas require proper management, in addition to wetlands regulation to successfully protect the functions that wetlands offer

The Drinkwater River system and contributing streams dominate wetlands on the western side of Hanover. The Benn Mann Brook, Shingle Mill Brook, Longwater Brook, Cushing Brook, French Stream and Drinkwater River all have major wetland areas associated with the channeled waterways. The generally flat topography with low, rolling hills, abundance of water, and favorable soils control the local hydrology, creating several large open swamps which are part of the extensive wetland and waterway system. Hell Swamp, Pine Island Swamp, Peg Swamp, and a section of Beech Hill Swamp are aligned across the center of the Town, and each of these swamps, eventually flow into the Drinkwater River System (even the Beech Hill Swamp which first drains into Rockland and back into Hanover along French Stream). Wetlands in the vicinity of Shingle Mill Brook and a northern section of Drinkwater River support habitats of rare wetland wildlife and certified vernal pools.

Wetlands in the southeast corner of Hanover, including some old cranberry bogs, are present along Iron Mine Brook, and an unnamed swamp, east of the town center is part of another large area of wetlands. The remainder of the Indian Head River Drainage Area, the southern portion of town, has smaller wetland areas scattered along tributaries or bordering the riverway.

The northeast part of town has few wetlands other than those associated with Hell Swamp; however, further south along the Third Herring Brook where the brook meets Molly/Silver Brook the waterway opens up to form the Old Pond Meadows. Although much larger section of the meadows is located in Norwell, a significant section of land is taken up by wetlands. Also, wetlands associated with tributaries to the Third Herring Brook are scattered along the eastern edge of town which is defined by this major waterway.

Figure 5-2 Water Resources

Surface Waters. Hanover, which lies within the North River Watershed, is rich in water resources and has a varied natural landscape that includes streams, ponds, wetlands and wildlife habitats. Almost 20% percent of Hanover's terrain is comprised of water bodies and water-related land forms, including wetlands. In addition to the rivers that form Hanover's borders, the Drinkwater River meanders through the western side of town. Numerous streams also meander across the town, including: Ben Mann Brook Shinglemill Brook, Silver Brook, Molly's Brook, Torrey Brook, Iron Mine Brook, Cushing Brook and Longwater Brook. Hanover also has boasts numerous ponds and swamps, including: Forge Pond, Hackett Pond, Shinglemill Pond, Peterson Pond, Mill Pond, Factory Pond, Pine Island Swamp, Wampum Swamp, Peg Swamp, Hell Swamp and a small portion of Beech Hill Swamp in south western section of town (majority is in Rockland).

Table 5-4: Surface Waters in Hanover

Drinkwater River	Luddam's Ford Pond	Cushing Brook
Indian Head River	Lily Pond	Longwater Brook
North River	Hell Swamp	Torrey Brook
Forge Pond	Old Pond Swamp	Iron Mine Brook
Shinglemill Pond	Pine Island Swamp	Silver Brook
Hackett Pond	Peg Swamp	Molley Brook
Factory Pond	Wampum Swamp	Shingle Mill Brook
Mill Pond	French Stream	Third Herring Brook
Peterson Pond	Ben Mann Brook	

Source: USGS Topographic Maps; Whitman, Hanover, Weymouth, Cohasset Quadrangles

Details on Hanover's surface waterbodies located in Hanover are described in Table 5-5. A phone interview, conducted on March 25, 1996, with Warren Kimball, an Environmental Engineer with the DEP Office of Watershed Management, provided the information on the size and water quality classification of the waterbodies. Availability of public access to each waterbody was determined through field inspections.

Table 5-5: Classification of Surface Waters in Hanover

<i>Waterbody</i>	<i>Classification</i>	<i>Status²</i>	<i>Pollutant - Sources²</i>	<i>Access</i>
French Stream	B ¹	PS	Organic enrichment/DO, nutrients, pathogens - natural municipal point sources, non-urban runoff	
North River	SA ¹	NS	Organic enrichment/DO, nutrients, pathogens - septic tanks, non-urban runoff, marinas	
Drinkwater River	B ¹			Summer Street near Rockland line. Also Route 139 in West Hanover (canoe)
Indian Head River	B ¹	PS	Nutrients, organic enrichment/DO - municipal point sources, natural	Indian Head Drive (canoe launch)
Forge Pond ³	B			
Shinglemill Pond	B			Webster & North Streets
Hackett Pond	B			SSNSC land on Hacketts Pond Drive
Factory/Lily Pond ³	B			King Street
Mill Pond	B			
Peterson Pond	B			
Third Herring Brook	B ⁴			
Ben Mann Brook	B			None
Cushing Brook	B			Whiting and Circuit Streets
Longwater Brook	B			Summer & Hanover Streets
Torrey Brook	B			
Iron Mine Brook	B			
Silver Brook	B			
Molley Brook	B			
Luddam's Ford Pond				Elm & Water Streets (canoe)
Shingle Mill Brook	B			Webster & North Streets

¹ 314 CMR 4.06 Table 29, South Shore Coastal Drainage Area

² Massachusetts Bays 1995 Comprehensive Conservation and Management Plan "An Evolving Plan for Action" (see "Status Codes" below for key)

³ No fishing due to mercury contamination

⁴ According to a conversation with Warren Kimball, DEP, there is a restriction on increasing discharges

The DEP has not had the opportunity to sample every waterbody within the state, therefore, only the asterisked waterbodies in the above table have been classified. According to DEP policy, waterbodies that have not been classified are assumed to be Class B (if freshwater) or SA (if saltwater). The water quality classification of the unlisted waters are not based on sampling results. The water quality classifications are as follows:

Freshwater:

Class A - waters considered suitable for use as public drinking water supply;

Class B - waters suitable for aquatic life and wildlife and for primary and secondary contact recreation; and

Class C - waters suitable for aquatic life and wildlife and secondary recreation only

Saltwater:

Class SA - waters suitable for aquatic life and wildlife, primary and secondary contact recreation, and, in approved areas, shellfish harvesting;

Class SB - waters suitable for aquatic life and wildlife, primary and secondary contact recreation, and, in approved areas, shellfish harvesting; and

Class SC - waters suitable for aquatic life and wildlife, secondary contact recreation, and certain industrial cooling and process uses.

Status Codes:

S = supports all indicated uses

S/T = supports all uses, but threatened

PS = supports some uses

NS = supports no uses

The total surface area of Hanover is approximately 10,060 acres. Of this, approximately 70 acres are made up of open water, and another 2,000 acres are wetlands [Hanover soil study indicates 3,500 acres of land in town are wetlands, based on soil/drainage conditions], leaving approximately 7,390 acres of upland area. Many acres of wetland are protected within town and private conservation lands. That wetland acreage not protected within conservation land is severely limited in its development potential. Wetlands contain soils and drainage conditions that are unsuitable to support development without major disturbance and filling of wetlands. Wetland areas are vital for protection of both surface and ground water quality, fisheries and wildlife habitat, and provide flood storage as well. The Wetlands Protection Act and regulations set forth in 310 CMR 10.00 pursuant to the Act protect these swamps, bogs, and wet meadows from development. Major wetland systems in Hanover include areas adjacent to the many brooks and streams found in Hanover and are scattered through the town. Significant systems are associated with Benn Mann Brook, Shingle Mill Brook, Drinkwater River, Cushing Brook, Longwater Brook, and Torrey Brook located in the western part of the Town. Of these systems, some of the larger wetland areas in the western part of town include Pine Island Swamp, Peg Swamp, Wampum Swamp and Beech Hill Swamp (the majority of which is located in the adjacent town of Rockland). Additional wetland areas are associated with Forge Pond, Factory Pond, Hackett Pond and Shingle Mill Pond located within the western part of the town. Within the eastern side of town, significant wetland areas are associated with Iron Mine Brook, Third Herring Brook, Silver Brook, as well as Mill Pond and Peterson Ponds. Significant wetlands within this portion of town include Hell Swamp, that portion of Old Pond Meadows within town limits, and a large, unnamed wetland located northeast of Twin Fawn Drive. Along the southern border of Hanover, there are wetlands associated with the Indian Head River.

Additional land that may be subject to the Wetlands Protection Act and more difficult, if not unsuitable, for development include historic gravel pits and the agricultural land utilized for cranberry bogs. There are at least three gravel pit areas and a sand pit with excavated low lying areas that collect water that may be subject to the act after mining activities are abandoned. Cranberry Bogs are located in several areas throughout the town which are also excavated wet areas that may be protected from development upon abandonment of agricultural use.

Land Adjacent to Rivers and Streams. The recently enacted Rivers Protection Act further restricts the development potential of land adjacent to rivers and streams, regardless of whether the land is upland or wetland. This Act will be of major importance to the Town of Hanover due to the number and distribution of rivers and streams throughout the town, but the degree of impact will not be realized until the Department of Environmental Protection implements regulations pursuant to the Act.

Ground Water Quality Protection. The locations of public water supplies and the need to protect the quality of the water supply also should restrict the development of certain areas in Hanover. Well Districts have been delineated by the Town and include districts 1, 2, and 3 all located along the eastern side of the Town. Almost 25% of the town is within the Aquifer Protection Zone surrounding these wells. Potential development within this region of town should not include heavy industrial or manufacturing uses in order to protect water quality. Town

regulations for the Water Resource Protection Districts reflect this by restricting uses to primarily open space, agriculture, and residential.

Flood Hazard Areas

Hanover has six Floodway Boundary and Floodway maps (Floodway) and six Flood Insurance Rate Maps (FIRM) which show the areas subject to flooding within the town (*see Figure 5-3*). The Floodway maps include the boundaries of all floodways in the town, while the FIRM maps designates zones of flooding including information on the probable depth of maximum high water in the floodways.

Because of Hanover's extensive river and tributary system, many flood hazard areas are spread throughout the town. All of the streams and brooks which are part of the Drinkwater River system have areas of potential flood hazard. On the west side of Hanover the Shingle Mill Brook, Cushing Brook, Ben Mann Brook, and the Torrey Brook present limited flood hazard as well as larger open wetland or swamp areas. Flooding from the Longwater Brook and French Stream is more confined to areas directly adjacent to the banks of the waterways. The Drinkwater river is also fed by Pine Island Swamp, Peg Swamp, Hell Swamp and Wampum Swamp, as well as an unnamed wetlands north of Route 139 between Plain Street and Grove Street and an area behind Cedar School all of which are marked as areas of 100-year flood hazard. The last areas of flood hazard area associated with the Drinkwater River system is a section of Beach Hill swamp on the western boundary of Town.

Flood hazard associated with Third Herring Brook and the Indian Head River Drainage areas are more limited than the Drinkwater river system. Molly Brook and Silver brook drain into the Third Herring Brook with few areas of expansive flood hazard. The most notable exception is Old Pond Meadows along Third Herring Brook; however, the majority of this wetland is in the bordering town of Norwell. Iron Mine Brook, part of the Indian Head River Drainage area, has several wetland and swamp areas which present 100-year flood hazard. These wetland areas are located to the west of Route 53 between Hanover Street and Silver Street and surrounding the cranberry bogs downstream. Other flood areas along the Indian head river are limited, aside from a few small unnamed streams which could potentially flood areas where water drains into the Indian Head River. The last area marked on the FIRM and Floodway maps, below the Curtis Crossing Dam forming the headwaters of the North River, shows a wetland area subject to flooding in the southeast corner of the Hanover.

It should also be noted that there are a few wetland areas in Hanover which do not appear on the FIRM and Floodway maps. The USGS topographic quadrangles which include Hanover show a wetland area between Colonial Drive and Main Street in the center of Hanover, a small wetland area northeast of the intersection of Whiting, Cedar and Pleasant streets, and an area equidistant between Forge Pond and the town line between Rockland and Hanover. Four other small wetland areas which are not included on the Firm or Floodway maps are an area west of Bardin Street, an area northeast of the intersection of Center Street and Old Cross Street, an area south of Route

Figure 5-3: Flood

139 and west of Tindale Way, and as area north of the intersection of Grove Street and Main Street. All of the above mentioned wetland areas are noted on the local Wetlands Map even though they don't appear on the FIRM or Floodway map.

Aquifer Recharge Areas

An aquifer protection zone is located within the eastern portion of the Town of Hanover. This zone is defined as the area in which the conditions indicate that the surface water and ground water within the area directly supply the Town wells. Three wellhead protection zones surrounding three well fields with a total of seven wells located within the aquifer protection zone.

Section VI.H. of the Hanover Zoning By-Law, dated May 1994, describes uses permitted and uses considered hazardous to the water supply and prohibited within the aquifer protection district. This section of the Zoning By-Law also describes the measures to be taken in order to insure water quality and sustained aquifer recharge within the Water Resource Protection Zone. These include limiting the area of impermeable surface and routing runoff from paved areas through water quality inlets prior to release to recharge the ground water.

Vegetation

The value of vegetation as a natural resource is unfortunately often overlooked or taken for granted in many communities. The usefulness of vegetation extends beyond its traditional role of providing aesthetically pleasing views and variety in the landscape. Woodlands, wetlands, abandoned fields and orchards are all forms of vegetation. In addition to creating and landscape, vegetation plays a variety of roles:

- protects surface and groundwater bodies by stabilizing soils and preventing erosion
- acts as a visual and sound buffer between incompatible uses
- provides wildlife habitat
- provides recreational opportunities
- improves air quality¹⁰

Hanover is vegetated with a variety of plant species commonly found on well drained upland soils throughout southeastern Massachusetts. Pine and oak forests dominate the upland forests. Other species include hemlock, swamp maple, hickory, cedar, wild cherry, and birch.

Of particular concern is protecting and preserving vegetation that comprises the unique natural communities found within the Town of Hanover. Massachusetts Natural Heritage & Endangered Species Program, Division of Fisheries & Wildlife, has listed one such area located within Hanover as an "Exemplary Natural Community". This area is located within the southeastern corner of town, adjacent to the Indian Head River. Specifically, the community located along the river is classified as a Gulf of Maine Freshwater Tidal Marsh, which are uncommon natural communities in Massachusetts because they are limited by geology and geography to short stretches of tidal rivers in coastal areas. Freshwater tidal marshes are often close to developed

¹⁰ Town of Hanover. 1979. Hanover Open Space Plan

areas and have been partially filled or destroyed by channelization of the river, and have been impacted by oil, pesticides, and heavy metal effluent, and excess nutrients from septic and sewage systems. Development within this area of Hanover should undergo additional regulation and residential septic systems should consider additional innovative designs discussed elsewhere.

Vegetation within this community is diverse, with herbaceous plants, grasses, and rushes all growing mixed together. Vegetation zones are present, although seldom distinct. The lowest areas have aquatic floating and emergent plants, and the higher areas support a taller mix of plants, often dominated by cattails or sweet flag, or wild rice in late summer. There is a pronounced seasonal sequence of plant dominance, with the lower areas going from bare mud to broad-leaved plants (such as arrow-arum), then to dominance by grasses and herbaceous plants. Variation in diversity of species composition and growth form are typical of freshwater tidal marsh communities.

Aquatic vegetation expected to be present includes arrow-arum (*Peltandra virginica*), Pickerel weed (*Pontedaria cordata*), Arrowheads (*Sagittaria latifolia* and *S. rigida*), and yellow water lily (*Nuphar luteum*). Herbaceous annuals such as jewelweed (*Impatiens* spp.), smartweeds and tearthumbs (*Polygonum* spp.), and bur-marigolds (*Bidens* spp) are among the plants encountered in areas scoured by strong fall and winter tidal currents. Sweetflag (*Acorus calamus*), tall reed grass (*Phragmites communis*), in non aggressive populations, both cattails (*Typha angustifolia* and *T. latifolia*), spike-sedges (*Eleocharis* spp.), bulrushes (*Scirpus* spp.), and bur-reeds (*Sparganium* spp.) are common perennials of the freshwater tidal marsh. Cordgrasses and saltmeadow hay (*Spartina* spp) that dominate salt marshes do not dominate in the freshwater tidal marshes, although other grasses such as will rice (*Zizania aquatic*) and sedges may be important components of the freshwater tidal marsh community. The freshwater tidal marsh community includes many state listed rare species, including Parker's Pipewort (*Eriocaulon parkeri*), Long's Bitter-Cress (*Cardamine longii*), River Arrowhead (*Sagittaria subulata*), Estuary Beggar-ticks (*Bidens hyperborea*), and Pygmyweed (*Crassula aquatica*). The structural diversity of the vegetation (broad leaved plants, grasses, and shrubs interspersed with open water) supports a high diversity of bird life. Ducks and geese, freshwater snakes and turtles, and insects are more diverse in freshwater tidal marshes than in saltwater tidal marshes, although the fish, molluscs, and zooplankton fauna is much less diverse.

According to Massachusetts Natural Heritage & Endangered Species Program, Division of Fisheries & Wildlife, several of Hanover's wetland areas contain three rare species of vascular plants. All three have the state status "Endangered".

Estuary Beggar-Ticks was first observed in 1928 and last reported observed in 1987. This plant is an annual that reaches the height of a half of a meter, and has a yellow flower that appears from August through September. Its habitat is generally in tidally influenced estuaries, but occur well upstream where salinity is low, as is the case in Hanover. Estuary beggar-ticks is considered an "Endangered" species in Massachusetts. Only three occurrences have been reported. This species is rare in the state because it is near the southern limit of its range and

because fewer than five exemplary occurrences of the community type it inhabits are found in Massachusetts. Since one of these exemplary occurrences of the community type is located within the Hanover Indian Head River freshwater tidal marsh described above, it is important that planning decisions protect and preserve this community type.

The second endangered species of vegetation also found within the Indian Head River freshwater tidal marsh is the Estuary Pipewort, which is a small, delicate, erect perennial in the Pipewort family. It is grass like in appearance and grow 2-6 cm in length, and has small whitish to yellowish flowers that appear from late July to late September. The Hanover location is one of four current stations and three historical stations in which Estuary Pipewort has been identified. The last year that it was reported observed in Hanover is 1993.

River Arrowhead is the third endangered species found within the Indian Head River freshwater tidal marsh.

Fisheries and Wildlife

According to the Massachusetts Natural Heritage & Endangered Species Program, Division of Fisheries & Wildlife, there are no endangered species of fisheries of wildlife within Hanover (note: they do identify several endangered/exemplary vegetation communities which are discussed in the vegetation section.)

The marshes, wet meadows, ponds and streams in Hanover, especially along the Town's three rivers, form a wildlife corridor and provide important wildlife habitat. Fisheries and wildlife species found in Hanover and southeastern Massachusetts are too numerous to list individually, however Table 5-6 lists some of the most common species found in the region.

Table 5-6: Common Wildlife and Fish Species in Southeastern Massachusetts		
Rabbit	Trout	Turkey Vultures
Possum	Shad	Crows
Raccoon	Herring	Blue Jay
Fox, Red and Gray	Chain Pickerel	Cardinals
Coyotes	Large Mouth Bass	Chickadee
Deer	Small Mouth Bass	Red Wing Black Birds
Squirrel, Red, Gray, Flying	Yellow Perch	Grackels
Bats	White Perch	Starlings
Chipmunk	Sunfish, Pumpkin Seed, Blue Gill	English Sparrows
Moles	Suckers	Morning Doves
Mice	Minnows and other small fish	Bob White Quail
River Otter	Gray Horned Owl	Ruffed Grouse
Beaver	Bard Owl	Ring Neck Pheasant
Mink	Screech Owl	Canadian Geese

Weasel	Saw Wet Owl	Mallard
Skunk	Hawk	
Muskrat	Osprey	

Source: Telephone conversation with Dick Turner of Massachusetts Division of Fisheries and Wildlife, Southeastern Massachusetts Field Office. October 9, 1996.

Areas of the North River, downstream from Hanover, provide an important habitat for spawning and migration of Alewife, American shad White perch, Rainbow smelt, and Atlantic tomcod fish species. Atlantic salmon are listed as using this same area as a migratory area. In addition, the outer estuary area of the North River is listed as shellfish growing waters for mussels and oysters. Upstream areas such as Hanover must be very cognizant of water quality in the North River, and effects of point and non-point source runoff on the ability of the North River to support economically valuable fisheries.¹¹

Areas of Critical Environmental Concern

Although Hanover does not contain any State recognized Areas of Critical Concern (ACEC), as regulated by the Executive Office of Environmental Affairs (EOEA), the natural resources in Hanover are significant. 301 CMR 12.00 defines ACECs as “areas within the Commonwealth where unique clusters of natural and human resource values exist and which are worthy of a high level of concern and protection”. Criteria for designation as an ACEC are:

- Threat to public health through inappropriate use
- Quality of the natural characteristics
- Productivity
- Uniqueness of area
- Irreversibility of impact
- Imminence of threat to resource
- Magnitude of impact
- Economic benefits
- Supporting factors.

These factors do not need to be weighed equally, nor must all the factors be present for an area to be designated. In Hanover, the water supply is a critical resource and any area that, if developed, may create a negative impact on the water supply is an area of critical environmental concern, regardless of the official designation from EOEA.

¹¹ Atlantic Coast Ecological Inventory, Boston Quadrangle. (42070-A1-250) US Fish & Wildlife Service. 1980.

HISTORIC RESOURCES

Historic Buildings

The Stetson House, near Hanover Town Hall, was built by Samuel “Drummer” Stetson in the early 1700’s. Town Meetings and religious services were held in the house during its early years, and since 1979 the house has been listed on the National Register of Historic Places. The house is now owned by the town and is open for public tours under the direction of the Town appointed overseers. A citizens group, Friends of Stetson House Inc., and others aid in the preservation and upkeep of the property.¹²

The historic “Line House” in the Assinippi section of Hanover which straddles the Hanover and Norwell town line. The house originally served as the Post Office and Selectmen’s Office for Hanover, but since these offices were in the Norwell section of the building it was deemed to be illegal to conduct Hanover town business in another town. The dilemma was solved by renaming the area where the house was located as “neutral territory” with the name Assinippi. This Indian name translates to “rushing clear water” or “rocks over water” and commemorates a nearby Indian Meeting Ground on Third Herring Brook. This same area was also the crossroads of two Indian Trails: Plymouth Path and Bay Path.¹³ A complete list of historic structures in Hanover is located in Section 4.

Historic District

In late 1995, Massachusetts Historical Commission voted to nominate Hanover Center to the National Register of Historic Places (NRHP). On May 9, 1996, the district was approved by the NRHP and became a National Register District. The district is comprised of twenty properties in Hanover’s town center. The district contains a well preserved grouping of buildings and sites, reflecting the historical and developmental core of the community. These buildings range in date from the Stetson House, circa 1716 to the Sylvester School, circa 1927. Other buildings within the proposed district include the First Congregational Church, the founding body of the town; the parsonage of the church, circa 1855, from the Greek Revival period; the Town Hall designed by architect Luther Briggs II in 1863, and expanded in 1893 by well-known local architect J. Williams Beal; and the John Curtis Library designed by another Hanover architect, Edmund Q. Sylvester.

The Civil War Monument, a granite obelisk, designed by J. Williams Beal in 1878 at the age of 23 just after his graduation from Massachusetts Technological Institute, is located in the center of the cluster of buildings. The Hanover Cemetery, with earliest burials from 1727, contains a large number of early slate markers concentrated behind the church, and provides a back drop to the historic center along the north side of the district.

¹² Ibid.

¹³ 1996 Street Map and Guide. Hanover Chamber of Commerce.

Listing of the Hanover Center Historic District provides recognition of the community's historic importance and assures protective review of projects that might adversely affect the character of the district. Listing in the National Register does not mean that limitations will be placed on the properties by the Federal government. In Massachusetts, properties nominated to the National Register are automatically listed in the State Register of Historical Places. State Register properties owned by municipalities and nonprofit organizations may compete for state restoration

Cultural and Historic Areas

According to Massachusetts Historical Commission's (MHC) Massachusetts Cultural Resources Information System (MACRIS), there are 340 historic buildings and sites in Hanover. Many of these historic resources predate incorporation of Town in 1727. Historic buildings include Table 4-7 lists most of the locally significant historical buildings and sites in Hanover.

Table 5-7: Historic Buildings/Sites in Hanover		
Historic Name	Street Number	Location
Percy Bonney Blacksmith Shop	20 Broadway	Hanover
Laphain House	53 Broadway	Hanover
Clark House	60 Broadway	Hanover
Charles Gleason House	96 Broadway	Hanover
Daniel Turner House	168 Broadway	Hanover
Robert Dwelley House	178 Broadway	Hanover
Hanover Fire Company No. 5	207 Broadway	Hanover
Broadoak Farm	336 Broadway	Hanover
Benjamin Stetson House	519 Broadway	Hanover
Joseph Josselyn House	607 Broadway	Hanover
Thomas Merritt House	677 Broadway	Hanover
Isacc Buck House	741 Broadway	Hanover
Saint Mary's Catholic Church	758 Broadway	South Hanover
Elijah Sylvester House	839 Broadway	South Hanover
J. Sylvester House	887 Broadway	South Hanover
Thomas Josselyn House	1003 Broadway	South Hanover
South Hanover General Store	1143 Broadway	South Hanover
Broadway Bridge Over Indian Head River	Broadway	South Hanover
Hoxia House	119 Center Street	Hanover Center
Timothy Robbins House	271 Center Street	Hanover Center
Shuble Munroe House	339 Center Street	Hanover Center
Seth Bates House	553 Center Street	Hanover Center
Saint Andrews Church	17 Church Street	Hanover
Dr. Howes House	31 Church Street	Hanover
Hatch Farm	561 Circuit Street	Fireworks

Prince Stetson House	615 Circuit Street	Fireworks
Historic Name	Street Number	Location
King Street Grammar	625 Circuit Street	West Hanover
Mordecai Ellis House	676 Circuit Street	West Hanover
Ellis Pratt House	939 Circuit Street	West Hanover
Darling Cemetery	959 Circuit Street	West Hanover
David Darling House	969 Circuit Street	West Hanover
Clapp Rubber Factory Worker Housing	8 Clapp Road	South Hanover
Columbia Road Bridge over North River	Columbia Road	Hanover
South Hanover Train Station	172 Cross Street	South Hanover
Philips Tack Factory Stetson House	Cross Street	South Hanover
Abner Dwelley House	48 Elm Street	Hanover
Bailey - Donnell House	250 Elm Street	Curtis Crossing
Absaloms Rock	Great Rock Road	North Hanover
Theophilus Witherell House	49 Grove Street	Hanover Center
Nathaniel Stetson House	118 Hanover Street	Hanover
Congregation Church Parsonage	515 Hanover Street	Hanover Center
John Curtis Free Library	534 Hanover Street	Hanover Center
First Congregational Church	547 Hanover Street	Hanover Center
Hanover Town Hall	550 Hanover Street	Hanover Center
Jashua Staples House	623 Hanover Street	Hanover Center
Edward Briscoe House	715 Hanover Street	Hanover Center
David Torrey House	769 Hanover Street	Hanover Center
Library Hall	1206 Hanover Street	West Hanover
Mill Philips	1390 Hanover Street	West Hanover
Josselyn Store-West Hanover Post Office	1452-145 Hanover Street	West Hanover
Mordecai Ellis House	1566 Hanover Street	West Hanover
Cyrus B. Josselyn House	113 King Street	Fireworks
Hanover Carding Mill	127 King Street	Fireworks
George R. Josselyn House	160 King Street	Fireworks
Charles Josselyn House	169 King Street	Fireworks
Hanover House	334 King Street	Fireworks
Stephen Bailey House	408 King Street	Fireworks
Amos Turner House	562 King Street	Fireworks
David Gardner House	590 King Street	Fireworks
Sylvester House	402 Main Street	
Win Stockbridge House	429 Main Street	
Alms Hanover House	506 Main Street	Mercer Square
Jacob Bailey House	526 Main Street	Mercer Square
Benjamin Curtis House	569 Main Street	Mercer Square
Arthur Bailey House	633 Main Street	North Hanover

Benjamin Stetson House	646 Main Street	North Hanover
Historic Name	Street Number	Location
John Curtis House	702 Main Street	North Hanover
Slop Shop	714 Main Street	Mercer Square
Ezra Whiting House	715 Main Street	North Hanover
Col. John Bailey House	733 Main Street	North Hanover
Curtis School	848 Main Street	North Hanover
Whiting Curtis House	894 Main Street	North Hanover
Jesse Curtis House	912 Main Street	North Hanover
Baptist Church Meeting House	992 Main Street	North Hanover
Hanover Baptist Church Parsonage	1024 Main Street	North Hanover
Thomas Hatch	1041 Main Street	North Hanover
C.G. Mann Store	1044 Main Street	North Hanover
Benjamin Mann House	1078 Main Street	North Hanover
Benjamin Mann House	1095 Main Street	North Hanover
Levi Mann House	1137 Main Street	North Hanover
John Brooks Store	1152 Main Street	North Hanover
Abner Curtis House	1264 Main Street	North Hanover
Jonathan Turner	1271 Main Street	North Hanover
Seth Curtis House	1305 Main Street	North Hanover
Civil War Monument	Main Street	North Hanover
John Studley House	134 Old Washington Street	North Hanover
Old Washington Street Bridge over North River	Old Washington Street	Hanover
Benjamin Studley House	146 Pleasant Street	Hanover
James Whiting	324 Pleasant Street	Hanover
Cyrus Josselyn House	112 School Street	Fireworks
Drinkwater Hall Firemans Association	School Street	Fireworks
Melzar Curtis House	294 Silver Street	Hanover Center
Hanover Cemetery	Silver Street	Hanover Center
Josselyn - Bates House	74 Spring Street	Hanover Center
Joseph Curtis House	66 Union Street	Mercer Square
Benjamin Curtis House	179 Union Street	Mercer Square
Turner and Whitman Law Offices	25 Washington Street	Hanover
Builder Sylvester House	40 Washington Street	Hanover
Edward G. Sylvester House	65 Washington Street	Hanover
Albert Smith House	128 Washington Street	Hanover
Hanover Academy Building	195 Washington Street	Hanover
Wales Tavern	199 Washington Street	Hanover
Joseph Eells House	232 Washington Street	Hanover
Jothan Cushing House	242-240 Washington Street	Hanover

Saint Andrews Church Rectory	288 Washington Street	Hanover
Historic Name	Street Number	Location
Barstow House	323 Washington Street	Hanover
Henchman Sylvester House	346 Washington Street	Hanover
Robert Sylvester House	417 Washington Street	Hanover
Brooks and Young General Store	2108-2111 Washington Street	Hanover
Watermans House	330 Water Street	South Hanover
Watermans Tack Factory	360 Water Street	South Hanover
Project Dale House	361 Water Street	South Hanover
Union Cemetary	Webster Street	North Hanover
Luddams Ford Bridge over Indian Head River	West Elm Street	Curtis Crossing
Sylvanus Whiting House	88 Whiting Street	Hanover
Justus Whiting House	111 Whiting Street	Hanover
Whiting Street School	142 Whiting Street	Hanover
Ezra Whiting House	183 Whiting Street	Hanover
William Whiting House	184 Whiting Street	Hanover
Joshua Mann House	335 Whiting Street	Hanover
David Cushing House	385 Whiting Street	Hanover
Wing House	64 Winter Street	Winslows Crossing

Source: Massachusetts Historical Commission MACRIS Street Index for Hanover. December, 1993.

CULTURAL RESOURCES

Scenic Resources

Scenic resources need not be a specific view or location, but may be a combination of features that come together to create an aesthetically pleasing situation, such as a tree lined street, a rolling meadow, a hilltop, or an old farmhouse. The following were identified as treasured scenic and unique resources by the participants in the Open Space public forum:

- North River and Stone Bridge
- Indian Head River
- Town Hall area
- Folly Hill
- Ponds off Ring Street
- Four Corners
- Stetson House
- Briggs Stable
- Cervelli's Farm
- Robinson Pasture
- Third Herring Brook
- Sylvester Fields
- Absalom Rock
- Hacketts Pond
- Broadway
- Factory Pond with Island
- Luddams Ford and abandoned railroad bed along the River

The Scenic Roads Act (M.G.L. chapter 40, section 15C) allows a municipality to designate any non-numbered route or state highway as a “scenic road”. Once designated, any proposed repair, maintenance, reconstruction or paving work that involves the cutting of trees or destruction of stone walls needs prior approval of the Planning Board. Designating a road as scenic will allow for the preservation of existing rural and natural aesthetic qualities, and thereby contribute to the overall rural character of a community. The Town of Hanover has designated the following roads as Scenic Roads:

- Main Street
- Silver Street
- Center Street
- Broadway Street
- Whiting Street
- Union Street
- Washington Street (*from the bridge into Pembroke to Route 53*)

Unique Features/Resources

Attendees at the Open Space public forum on August 14, 1996, also indicated that the following aspects of Hanover make the community unique:

- North River
- Indian Head River
- Historic buildings - quaintness
- History/historic resources
- Abundance of wetland resources
- Country atmosphere

Additionally, the following features/resources are also unique to Hanover:

Vernal Pools. A parcel of town-owned woodlands on Silver Street contains two vernal pools, one of which is certified by the Massachusetts Natural Heritage and Endangered Species Program (administered by the state’s Division of Fisheries and Wildlife). The certified pool is reported to be home to spring peepers, fairy shrimp, toad tadpoles and caddis fly cases.

Rainbow Bridge. A footbridge across Third Herring Brook was used as a shortcut from the Hanover yards to Fox Hill. Names for its bowed shape, it has long since disappeared.

Hanover Yards (1668-1844). Looking downstream from the stone bridge, eleven shipyards could be seen with vessels in various stages of construction during the peak years of shipbuilding activity. From 1800 to 1808 at least 10 ships per year were built here by a work force of 400 ship carpenters. Two plaques mark the sites.

Washington Street Bridge. Wm. Barstow received 12 pounds sterling from the Colony in 1656 for building the first bridge to cross the North River. For foot and horse traffic only, it stood slightly upstream of the existing bridge. Replaced in 1682 with a cart bridge, the old stone

abutments remain visible. The current location was first built on in 1829, and the present stone bridge was completed in 1904.

The Crotch. At the head of the North River, formed by the confluence of the Indian Head River and Heritage Brook, this is one of only three major freshwater tidal marshes in Massachusetts.

Indian Head Canoe Launch. A combination of state and local agencies owns 50+ acres of conservation land in Hanover alongside the Indian Head River.

Luddam's Ford. The North River's easternmost foot crossing on the Old Bay Path going from Plymouth to Boston was named for the guide who carried Governor Winthrop across the river in 1632 on the way to visit Governor Bradford of Plymouth.

Chapman's Landing. This was the westernmost shipping point on the river. Iron ingots were landed at Humarock for shipment to the Hanover forges. The North River-built steamship "Mattakeesett" was used in this service.

Luddam's Ford Fish Ladder. Site of the early mills and Curtis Anchor Works, famous for the casting of the "Constitution" anchor. Later, the site of the Clapp Rubber Mills (1873), largest of its kind in the country. The remaining dam forces migrating fish to scale the fish ladder in their efforts to reach spawning locations upstream. Conservation land on both sides of the Indian Head River provides canoe access to the Wampanoag Indian Passage.¹⁴

Scenic Resources/Landscapes

The North River which runs through the southeastern portion of Hanover has been classified as a scenic river by the Commonwealth of Massachusetts Scenic River Protection Act of 1980 and by the U.S. Park Service National Natural Landmark enacted circa 1980. The scenic river corridor extends to the Cross Street Bridge. The Hanover Conservation Commission received a plaque recognizing the Town's success at preserving the significant area of the North River. The North River Commission was established to administer the provision of the Federal Scenic and Recreational River Protection Order for the North River. The NRC is comprised of representatives of all the towns through which the North River flows, including Hanover. A portion of the Third Herring Brook is also included in the Scenic Rivers Act.

¹⁴ The North and South Rivers Guide: North and South Rivers Watershed, Assoc. Inc. 1993

RECOMMENDATIONS

Concurrent with the preparation of this Comprehensive Plan, the Town of Hanover also prepared an Open Space and Recreation Plan (OSRP). Much of the content of this element, and the Open Space and Recreation element has been taken from the OSRP, therefore readers should refer to it for more specific information. The following natural and cultural resources related recommendations have been excerpted from Section 8 of the Plan. They are identified here, followed by objectives and specific action items. The following format is used in this section to outline the goals, objectives and actions; in Section 9 of the OSRP, these tasks are organized by responsible party and date for completion.

GOAL identified by roman numeral

OBJECTIVE identified by capital letter

ACTION identified by number and small letters

GOAL I: IDENTIFY, PRESERVE AND PROTECT THOSE HISTORIC, CULTURAL AND NATURAL RESOURCES THAT CONTRIBUTE TO THE CHARACTER OF THE TOWN OF HANOVER.

A. Prioritize and establish mechanisms for protecting critical parcels of land.

1. identify key parcels of land which are highly rated for protection by acquisition or other methods.
 - a. develop a priority ranking system and evaluate all significant vacant lands for value in the following areas: linkage with other conservation lands; water supply protection; wildlife habitat; farmland preservation; scenic vistas; recreation needs.
 - b. develop a computer data base of priority parcels and degree of protection.
 - c. establish/maintain effective communication between Assessors Office/Town Treasurer to identify when priority parcels become available for tax taking.
2. establish a committee responsible for contacting landowners of priority parcels and educating them on alternative methods of leaving their parcel in its natural state in perpetuity or available for public access as appropriate.
3. establish a Conservation Fund to have adequate monies available to protect critical parcels when they become available.
4. establish a land trust in Hanover.

- B. Protect (through acquisition, purchase, gift, conservation restriction, easement or tax title) the town's significant natural areas, and preserve the natural setting of the town's built environment.*
- C. Control growth and location of development.*
1. establish an Open Space Development Zoning By-law.
 2. amend subdivision regulations to provide for and maximize amount of open space maintained near or within proposed developments.
 3. create buffer strips of land adjacent to new facilities to reduce noise and visual impact of vehicles.
- D. Protect farmlands that are in active production or have high potential given the presence of prime farmland soils.*
1. identify candidates for Agricultural Preservation Restriction Program
 2. encourage landowners of farm, forest or recreational lands to enter into Chapter 61, 61A and 61B registration
 3. have action plan ready should priority 61/61A/61B lands become available
- E. Conserve natural vistas at critical locations which contribute to neighborhood or town character.*
1. identify scenic parcels of undeveloped land which contribute to the neighborhood charm and investigate ways to protect them according to A.1, above.
- F. Preserve historically significant buildings and sites.*
1. continue to identify sites of historical and archeological significance and maintain an inventory of these sites.
 2. encourage the use of Historic Easements.
 3. establish a formal History of Hanover program within the public school system to promote awareness of local history.

GOAL II: PROTECT AND ENHANCE THE QUALITY OF HANOVER'S SURFACE
AND GROUND WATER

- A. *Provide long range protection for sources of existing and future public drinking water supply.*
1. identify vacant lands within the zones of contribution of public drinking water supplies and target for acquisition or other means of protection.
 2. maintain inter-town communication to protect sources of public water supply which cross town borders.
 - a. evaluate watershed protection by-laws in adjacent towns to ensure compatibility.
 3. coordinate recreation and conservation land acquisition (between Water Department and other Town entities) to fullest extent possible so as to provide additional water resource protection.
- B. *Establish community education and outreach program.*
1. in conjunction with Water Department, actively educate households residing within zones of contribution to public drinking water supplies about household contaminants, septic systems, and other threats to water quality.
 2. encourage use of environmentally friendly products.
- C. *Identify threats to quality of public water supply and institute measures to prevent contamination.*
1. evaluate and revise as necessary the Underground Storage Tank by-law and guidelines of the Board of Health.
 2. maintain an inventory of the commercial or home occupations that store or handle hazardous materials, pesticides, herbicides or solvents (above established threshold quantities) and develop appropriate protective measures.
 3. evaluate the revised state regulations for septic systems, Title 5, and revise local requirements as appropriate.
 4. ensure local land use control powers are used to the fullest extent possible to protect the quality of present and future public water supplies.

- D. Develop and implement management plans to improve and maintain surface water quality through management of sewage, sheet runoff, as well as other runoff.*

GOAL III: INCREASE ENVIRONMENTAL AWARENESS AMONG ALL SECTORS OF COMMUNITY.

- A. Educate the public about local open space and recreation areas.*
- B. Introduce the Town's natural resources to children through the school programs.*
- C. Encourage the use of Town-owned lands for environmental education purposes for all age groups by holding nature walks for town residents on conservation properties and sponsoring annual events to clean up the litter and debris in conservation lands, riverways or other environmentally sensitive areas.*
- D. Establish a Friends of Conservation or similar group responsible for such activities as public awareness, land management, and fund raising.*
1. educate private landowners on available options for permanently preserving their land in an open state (e.g., conservation restrictions, transfer of development rights, easements, etc.)
 2. educate public on how local land use control can be used to protect the land, water and dependent biotic communities.